THE NEON NEWS

A NUTS-AND-VOLTS APPROACH

NUMBER 10 SPRING 1992

STAINS: The dirty truth

<Editors' note: There's nothing benders talk about as much as staining, and Voltarc's technical bulletin says more about it than anything else we've seen. Larry Bourque of their technical support office graciously allowed us to reprint this, and said that they would appreciate reader feedback (so would we). Their address is Voltarc Technologies Inc., 186 Linwood Ave., Fairfield CT 06430.>

Mercury tube darkening is preventable, and each type of darkening is associated with certain specific causes. The ability to recognize the different types and a knowledge of the causes make it possible to correct imperfect conditions and to employ procedures for best results.

It must be pointed out that a tube may have several things wrong with it. Sometimes these faults can be recognized individually and sometimes not. Most types of darkening are stains which start out light in color and gradually darken and spread with age. Older stains of certain types tend to look more alike. Therefore, identification of the various types is much easier when the tubes are new. It will be assumed in the following that only one defect is present in each instance.

1.0 Darkening around and next to the electrodes: There are at least three different kinds of darkening here; they can be easily differentiated by their color when the tubes are new and, with more difficulty, by color and extent when they are older.

1.1 The first kind is called sputter, and it appears either as a black spot or ring just in front of the electrode or anywhere on the electrode glass. It is mainly a metallic throw-off from the electrode shell. During the life of the tube, it may extend a distance of two to three inches from the electrode into the tube. It may also extend back toward the electrode press, covering all of the electrode glass. The end of the dark area away from the shell is usually fairly well-defined.

Sputter may appear during or after bombing. If it occurs during bombing it is caused by overbombing (by heating the electrodes too hot, for too long a time, at too low a pressure, at too high a current). If it occurs after bombing, conditions above may still have been the cause, but there are other possibilities: low filling pressure, operating the tube on a current higher than the design limit of the electrodes, use of uncoated electrodes or of electrodes having an inadequate supply of emission coating. Old tubes normally show some electrode sputter; this is to be expected. Ordinarily well-processed tubes should show little or no sputter during the first few hundred hours of operation.

1.2 The second kind of darkening starting from the electrode gives the clear glass a greenish color when the tube is lit. It may be yellowish or brownish when the tube is not lit. It starts just at the open end of the electrode shell, and the edge of the stain at the end away from the electrode is generally somewhat diffused. As the stain grows older, its color becomes darker. It creeps farther into the tube, covering the coating and preventing it from fluorescing. It can eventually cover the whole tube. This stain is associated with the emission coating and never appears when uncoated electrodes are used. Electrodes that have uncontrolled weights of emission coating are particularly difficult to bomb and tend to produce this kind of stain. Emission coatings that are completely and properly converted do not produce it unless they become contaminated. The conditions which cause the emission coating to produce this stain are:

1. Incomplete breakdown of emission coating during bombardment.

2. Underheating and/or incompletely degassing the emission coating and electrode shell (similar to 1 above.)

(see Tube staining, page 4)

Notes from the wide, wild world of neon

Seen in Antwerp: Argon/mercury orange powder in clear glass, a very vivid orange. (Why isn't this available in the U.S.?) In addition, I've heard of (but not seen) an argon-red powder here. One distributor told me that the chemical used was banned in the U.S.

From Fromer's Amsterdam and Holland guidebook:
"Amsterdam is a museum. Nearly 7,000 of its historic 17th-century buildings and hundreds of its graceful bridges are listed with the Dutch government and permanently protected from alteration, destruction, and the ugliness of neon." Aside from being insulting, it ain't true! Plenty of old gable-fronts are outlined in neon, not to mention the more common fluorescent-behind-plastic and the tacky-looking, half-burned-out strips of old incandescent bulbs.

Concerning "H" gas: It is used commonly here and several local suppliers have confirmed that it is simply a mixture of 25% argon and 75% neon. The name "H" refers to "Heisz," the German word for "hot." As such it burns hotter than straight argon or other mixtures (such as the popular 50-50 mixture used in the U.S.), and this helps keep the mercury vaporized in extremely cold weather (with, of course, larger startup voltages needed, approaching that of pure neon).

Had a hard week? Our local Neon Products representive, Eric Mooy, just came back from a trip to Asia, and reported that in Taiwan he visited a neon mass-production shop where 40 benders consume 100,000 electrodes per month. He said he was impressed by the fact that the pay was the same as for a glassblower in the Netherlands, until he found out they were working 14 hours a day, 7 days a week. He said that two benders, working with assistants and using jigs, can produce 50 "Budweiser" signs per day.

In need of a neon planner: In Amsterdam there's a window sign, "Travelplanner," with the second "l" made invisible by the window frame.

Useful names: High Tension Designers (currently a clothing company in Haarlem, Netherlands). Also two transformer brands advertised here are PUK (of Germany) and FART (Italian). No kidding.

In contrast with our observations last issue about personal and occupational health, concern about environmental pollution runs quite high in the Netherlands. By law old fluorescent bulbs and neon units cannot be chucked in the trash; they must be brought to special hazardous waste treatment centers where they are (allegedly) specially processed. So at all the sign companies I've been to there are bins of the used tubes waiting to go, and it costs the companies .75 guilder (40 cents) apiece to get rid of them.

'Amsterdam is a museum. Nearly 7,000 of its historic 17th-century buildings and hundreds of its graceful bridges are ... permanently protected from alteration, destruction, and the ugliness of neon.' — A tourist guidebook

In case you ever wondered what Zen is: it's a brand of neon-lit telephones. Made in Osaka, Japan, "Zen" phones are sold locally for 105 guilders ($60), available in pink or blue. For that inner calling.

Seen in Amsterdam: a window neon sign of two playing cards, fully enclosed in glass, quite old and dirty, and using bare, mildly stretched springs for the electrical connection between the electrodes. One spring vibrates continually, presumably from the 50-cycle magnetic field induced in it.

Colors never seen in nature (or neon): Two trendy boutiques in Amsterdam feature innovative neon "tailoring": one spray-painted its signs with ordinary enamel (cutting light output pretty drastically, but the pastels match the decor), and the other glommed some streaky clear blue stuff on a clear red tube for an eerie purple, dim but not too bad till you get within ten feet. Both were produced by local sign shops; we haven't yet called and asked how many hundreds of colors (or are they shades?) they offer their neon customers...

Dear comrades,

We're halfway through this year abroad, and running hard to keep up with jobs and newsletter and squeeze in a bit of fun as well.

For some months we didn't have enough material for an issue (that's our excuse for being late this time), but now it's all sprouted like the trees along the canals after the long, gray winter. Keep those stories coming, folks!

We have mostly tech nuggets this issue, with a few funny stories as well. We welcome Marj Inman and Dick Boonstra, and thank Matt Thompson for coming all the way to Amsterdam to do custom illustrations (and to join the Workshop).

If all goes well, you'll receive this while we spend a couple weeks in Greece -- minus computer, and perhaps out of sight of neon! More likely we'll be squinting and scratching our heads at whatever new kinks we see in Greek tubemanship. Though we can't imagine how it can top the pair of neon "Mannekin Pis" (Boy Pissing, both in word and image) on the tavern across from the famous Brussels sculpture of the same subject...

Cheers and beers (ever heard of "Grote Lul" brand?)

Ted + Val

Again: To contact us directly (much quicker than routing through Volcano), our address 'till summer's end is: C/O Neon Workshop, Van Diemenstraat 368, 1013 CR Amsterdam, NETHERLANDS, (tel) 011-31-20-626-3530, (fax) -2789.

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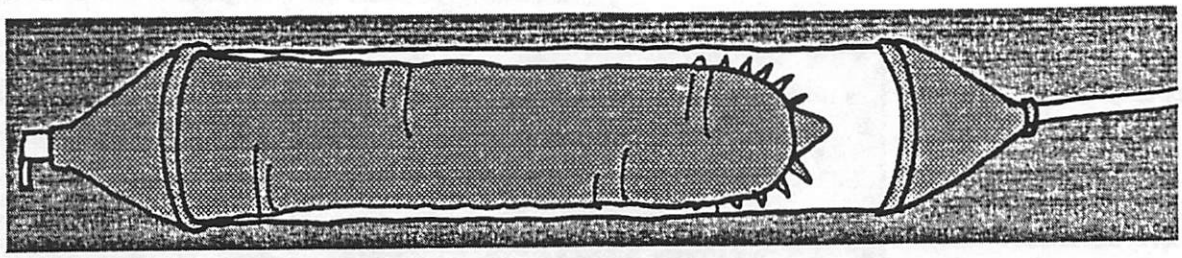
Safe sucks, and other tech tips for all types

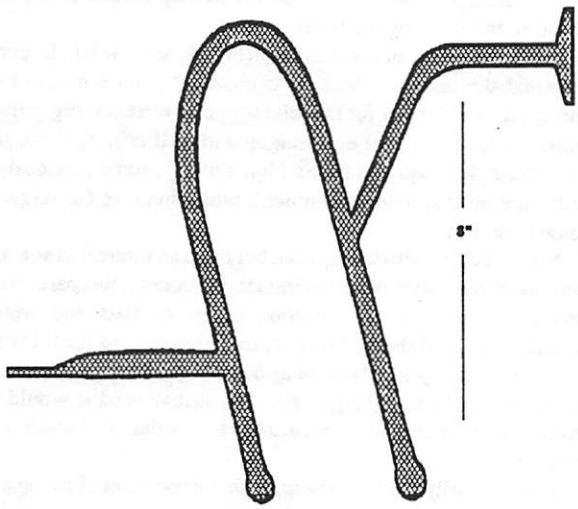


As a way of isolating your breath from the end of your blowhose, check out the "Condomatic," an idea passed on by Jed Schleisner (Oshkosh WI), who says he copied it from Steve Grossman (Washington DC).

Shown is the french tickler model (illustration by Matt Thompson): A condom is fitted in place inside a piece of 25mm glass, with the base of the condom wrapped around the outside of the glass. Then reducing fittings go on each end (anyone with a source for such fittings, please let us know). Onto one fitting goes a swivel, and then blowhose tubing onto both ends, producing an in-line flexible membrane. This still allows sucking and blowing, but keeps mercury downstream and lunch upstream.

As a not-quite-so-slick-but-you-don't-need-special-fittings alternative, one could use two pieces of the 25mm glass, both welded to tubulation-size glass at one end, and after slipping the condom inside one, tape them together at the large end.

<Val can't resist adding that glass is father to the condom as well: Condoms are made by dipping glass forms (of the appropriate shapes and sizes) into a vat of hot latex soup, then blow-drying them. Thanks to Amsterdam's marvelous Condomerie, which sells only you-know-what, for this information.>



Foretrap fights funk

Here is a simple glass gravity trap to help keep mercury, powder and bakutis (small unidentified objects) out of your manifold.

Some points to consider:

1) The best manifold design is short and fat; keep the glass diameter large, at least 15mm.

2) Make the unit detachable, and thereby easy to clean. For this I've used both Cajon-type connectors (prone to leakiness if the trap is bumped around) and glass KF fittings with pertinax clamps (work like a charm).

3) Having tried a number of smaller, shorter traps with mixed results, I can say that the height is critical (the more the better, keeping in mind point #1 above).

4) More "traps" can be added onto the same single piece, should there still be a problem with debris entering the manifold.

Helium rinse, take 2

<Editor's note: Here we reprint in full the Masonlite technical sheet on the "helium rinse" technique, as the previous version we published differed on a few of the specs.>

The use of a helium rinse as part of the process serves two purposes. Firstly any minute residual gases remaining in the tubes after the initial bombardment will be diluted by a factor of several thousand. Secondly the rinse will indicate if for any reason the bombardment was inadequate, by a visual deterioration in gas color, from a straw yellow to a bluish-white discharge.

Once the initial bombardment is complete and the tube temperature has fallen to approximately 100 C and a vacuum of between 10^{-2} and 2×10^{-2} (10 microns) has been achieved, close the main valve.

Introduce 5 millibars (4 torr) of helium gas.

Switch on the current set at 500mA. This current setting is the same for all ratings of electrodes except the 20mA type, which should be run at 200mA.

Allow the tubes to burn for at least one minute. If over this time period the gas discharge color remains a consistent straw-yellow color, this indicates clean, sufficiently bombarded tubes.

Switch off the current. Open fully the main valve.

Allow the tubes to cool to 50 C and fully evacuate to 10^{-3} (1 micron).

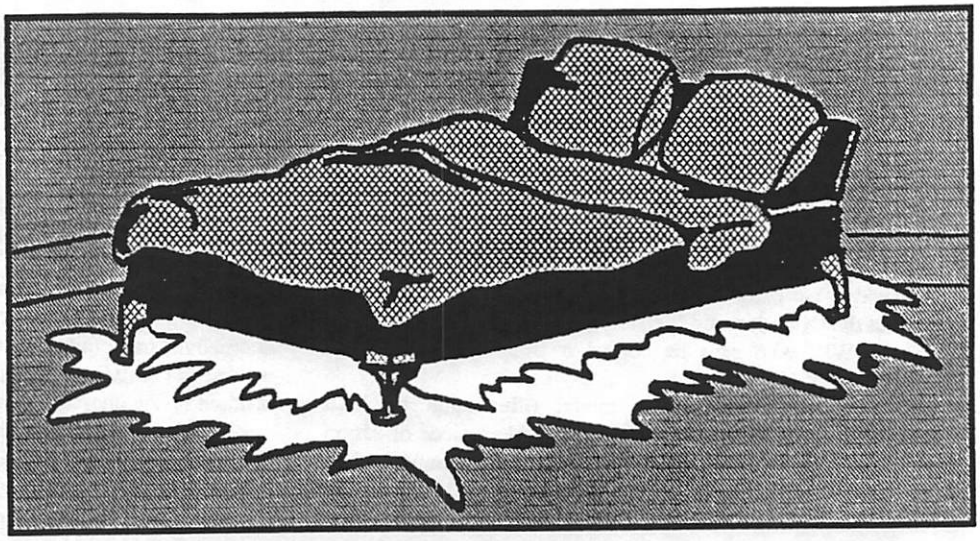
Fill the tubes with the required amount of rare gas and seal off the tube for ageing.

At the end of the one minute running time, if the gas discharge color has deteriorated, a second bombardment can be performed using the helium gas in the tubes as follows:

Increase the current to between 700 and 900mA to effect full heating of the tubes once more up to 250 C, keeping the main valve closed throughout. When this is achieved, repeat the test as above and continue through the rare gas filling process.

NOTE: Helium-neon mixtures, so-called cleaning gases, can be used; the discharge color should be a bright orange. Helium is recommended because it is cheaper and more readily available.

The Strange Case of the Doctor's Bed...



<Editors' note: Marj Inman of Mequon WI has "been bending for about three years now full-time, having escaped the more normal world -- I spent ten years working on computers with too many people who had obviously graduated from the School of Bad Management and Less Communication.">

By Marj Inman

Does everyone have customers who place a deposit and disappear? They will reappear, generally after a year and/or just after you have sold their dusty pieces to someone else.

We've had two of these cases recently; the first concerned a beaten-metal planet with Venusian-style neon rings, which had sat with a deposit on it for about a year. Just a week after we sold it to a customer who didn't like the piece he himself had designed (a Picasso-like cactus), the original depositor returned, with a vague explanation of having been out of the country for a year -- Mars, perhaps.

The next one I could see coming -- a doctor stopped by with a bed frame that he had designed, wanting two neon red tubes for inside underneath. Obviously wanting that ethereal feeling of floating on a radioactive cloud. So, we drilled the pilot holes, he took the frame to be black lacquered, we made the tubes... and waited. Periodically, we would communicate, to find that some poor woodworker seemed repeatedly unable to put a perfect finish on the bedframe. Supposedly, our doctor was sleeping on the floor all this time. We left it at "You call us," subsequently had a rummage sale, sold his tubes and, of course, I joked that it was time for the doctor to call, and within a few days -- there he was.

Now he was in the process of moving to a new apartment, and had gotten the bed back after almost a year, and when could we come install his neon?

With new neon red tubes in hand, I set out; this after several more reschedules, this guy was sizing up to be a true perfectionist. I was eager to see his place anyway, as it was my ideal loft in a converted warehouse. Of course, his rent turned out to be about four times that of mine -- mayhap I could find something not quite so ... finished.

There was a freight elevator, but it was crammed with moving items, so after carrying tubes, drills, tools, etc., up four flights of stairs, I realized that he expected me to help assemble the bed in addition to installing the tubes.

Fine. We took our shoes off (brand new WHITE carpet), installed the neon -- which took about 15 whole minutes even though the pilot holes for the tube supports were too big -- my life passing before my eyes as I imagined myself drilling through the painstakingly lacquered frame (don't worry, some black silicone will plug up that hole right quick), while hunting for larger, not longer, screws.

Not part of my job description, but I had an interest in seeing the bed assembled with the tubes intact. Of course, the parts had sat around so long that the bottom, a sort of slats and webbing arrangement, had shrunk/warped, so we assembled the thing three times, repeatedly nearly wiping out the precious tubes -- every screw had to be in exactly right. I almost wished it would have taken a little longer; then it would have been dark and made a great picture.

The bed really did look sharp, with the red neon glowing on the white carpet. But by this time I was quite happy to put my shoes back on and truck my tools down the four flights. Maybe I'll use the idea on my own bed!

(Tube staining, from page 1)

3. Poisoning of the emission coating or absorption of impurity gases resulting from:

a. an inadequate pumping system
b. the presence of water vapor
c. inadequately heated glass on the pump
d. contaminants in the tube or pumping system.

No other stain appears as frequently as this one. The cure lies primarily in bombing procedure.

1.3 The third type of stain at the electrodes is a grey cloudy formation extending varying distances into the tube. It is caused by vaporizing mercury out of or off of an electrode. The vaporized mercury condenses on the nearest cool surface, forming the grey cloud. For this reason, mercury should not come into contact with a hot electrode. (Rolling mercury in and out of an electrode can sometimes produce a black streak of concentrated mercury on the tube wall (see section 5.0). The grey cloudy stain may disappear or move as the tube is operated.

2.0 Darkening starting a short distance away from the electrode. There are four kinds of stains which take this location. Three can be serious but the fourth is generally unimportant.

2.1 The first kind is associated with ceramic-type electrodes and takes the form and color described in section 1.2. It is different only in that there is a clean area between it and the electrode when the stain is new. As the tube grows older, the stain may extend in both directions and close the original gap between it and the electrode. The edge of the stain at the end away from the electrode is diffused. It has the same cause and remedy described in section 1.2. Apparently, at the start, the ceramic focuses the stain a little farther

(see More spots, page 5)

ABCs of neon blocks

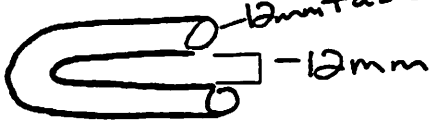
By Candice King

To improve both speed and quality try using support blocks under hot glass.

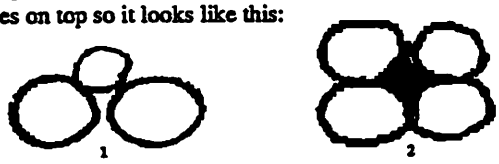
I've seen benders argue about what heights and types of blocks to use under their jumps between letters. Some don't use them at all. I prefer to use them because your work comes out even and uniform, and you don't waste time holding the glass and waiting for it to cool. You gain speed without sacrificing quality.

Using a block that is not the correct height for the size tube you're bending can cause scrunched up double-backs, or ones that are stretched out. Both cause weak units.

When bending a double-back or other bend you should have the space between the glass be the same as the diameter of the tubing. This produces the strongest bends. By using the correct blocks your work will come out strong and uniform every time. No more off-angles when sealing several letters together.



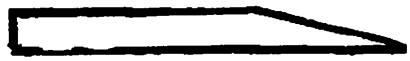
To make a block out of glass I cut four pieces of tubing about 6" in length and get out the trusty silicone gun. Place two pieces side by side and run a good bead of silicone down the middle, then stack the other two pieces on top so it looks like this:



The silicone will hold it together without oozing out the sides and getting on hot glass later. Make two sets in each size tubing (I color-code mine for easy identification).

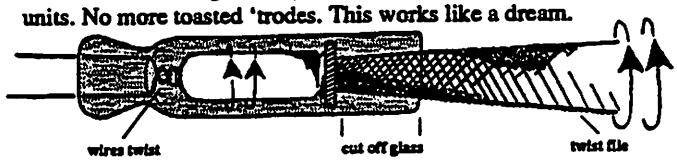
When you must have raised bends on each side of your letter ("P" or "E" in "OPEN") use two blocks, one on each side, so your work remains flat and the weight of the glass doesn't make your work flop around on the table when the glass is still hot.

Another tip: When making your forming block (the one you use to keep your curves flat), taper one end so it looks like this:



This way, when you must make a drop curve over another curve (the tail of a script "s," or the tip on a double-stroke lower-case "e"), you can do it in one heat without worrying about the hot glass touching the tube below. You just place the tapered end of the block between as you drop the top curve and bingo! A nice drop curve, no stress or cracks from touching hot glass to cold, and you can get the mica in for bombarding without forcing it. This is especially great if you are paint-dipping the units because there is no visible gap in the light.

And finally, who says an old dog can't learn new tricks? The shop I work in uses all EGL Supremes with the ceramic collar. I had a real short double-back to make with an electrode on the top of a "T." This "T" had to fit into a tight channel letter so I couldn't offset the electrode and a standard electrode was too long. All of a sudden a voice from Neon Heaven (Glen Bogue) said, "Just stick your file into the ceramic collar. Twist the shell all the way to the top and then cut the glass off." Why didn't I think of that? It's a great way to keep from using shorties on big units. No more toasted 'trodes. This works like a dream.



<Candice King writes from Tampa FL, a 15-year veteran of tubebending, lab- and lampwork glass.>

(More spots, from page 4)

away than does the non-ceramic electrode.

2.2 The second kind of stain, starting two or more inches away from the electrode, can cover an area of six to eight inches in length or, when very bad, the whole length of the tube except near the electrodes. It may start out as a light discoloration and may become completely black with age. There is a definite line between this stain and the clear area adjacent to the electrode. The edge of the stain at its end away from the electrode is indeterminate. This stain is caused by moisture in the tubing or pump system.

2.3 The third kind of stain has an appearance somewhat similar to the one above and is produced by small amounts of air in the tube. The air stain, however, has a fairly well-defined edge at both ends. It may move from one section of the tube to another and may finally disappear altogether. If a moving stain appears, it would be wise to check the vacuum system for leaks. A large amount of air will cause the tube to run very hot. The whole tube is likely to darken.

2.4 The fourth kind of stain at this location is a dark ring, generally quite narrow. It appears about one to 1.5 inches away from the electrode splice and may also appear on both sides of other splices and next to bends. (The stain which locates right on the splice or bend is described in sec 3.0.) In tubing containing calcium silicate (pink or Ca-whites) the ring sometimes has a pink color. In green tubing, it may be a lighter green than the rest of the tube. Generally, however, it is dark gray. In itself this discoloration is quite innocuous, and it does not become worse with age.

These rings are produced by locally heating moist tubing and by allowing combustion products from the fires to enter the tubing. The number of rings appearing can be reduced greatly by making bends only on tubing that is completely dry and by making splices only after the bends have been completed. If all moisture can be kept out of the tube, no rings will appear.

3.0 Dark bends and splices: Bends and splices may develop a discoloration which starts out grey and later turns black. In extreme cases, this darkening may be seen before pumping, but usually not until after pumping and operating the tube. Only the heated area of bends and splices and up to half an inch or so on either side is affected. It occurs mainly on tubing containing tungstates (blue powder) or halophosphates (white powder). For dark rings near the bends and splices see section 2.4 above.

This discoloration is caused by overheating the glass in the fire. Gentle heating prevents it. The glass should be heated only enough to make a strong splice without much "melting in," and just enough to make bends without kinking.

The discoloration on bends and splices on glass that has been heated too much can be reduced greatly by running clean water through the tubing before the electrodes are attached. A few minutes of full flow suffices. (A water flow that is too forceful may wash the powder out of the tube.) The tubes must then be

(see Seeing spots, page 12)

Singing the high-tech transformer blues...

By Joseph Keller

I love electronic transformers, but until now, I've encountered a ton of headaches with them.

For example, driving down the road, admiring your work through a shop window and you suddenly realize that one part of the sign is just ever-so-slightly brighter than the rest. Oh sure, you're the only one who will ever notice and you try to ignore it, but it's still there; the sign is imperfect, your credibility is on the line, you start losing sleep, people begin to notice the subtle changes in your personality, until you simply snap and end up weaving baskets on a steady diet of sedatives.

Or my other full-time favorite that I personally enjoy hating is those %@$#&!!! little adjustment screws. And I know that the new ones have the mercury migration problem fixed but WHAT ABOUT THE OLD ONES THAT I'VE ALREADY INSTALLED THAT I'M WATCHING ONE SIDE SLOWLY DIM?!

Anyhow, if anyone wants to try a great electronic transformer without those stupid, idiotic little adjustment screws that cost you at least three service trips while the sign is still burning in, try a Tunewell Startec model. I have found them to be reliable, self-adjusting, no mercury migration and can even clean up mercury staining on an old sign -- no kidding, I've seen it happen.

The company is friendly, willing to answer any and all questions about their product, and the things are practically indestructable. And the great thing is that there will always be consistant brightness throughout the sign, despite the footage differences.

Pricing by the book

Despite the $20 price tag, the new 1992 Neon Pricing Guide is a welcome sight. Now I can see that the sign I usually charge $200 for should be going for $850 and that I'm losing my shirt on labor.

The book builds upon itself, meaning you can't flip to the middle and expect to get any sort of price unless you go from the very front and work your way back. It seems to be very thorough, although it would have been helpful if they would have included a ficticious estimate from start to finish to give you an example to go by.

The format takes some time to figure out, but it is easier than doing neon-to-argon conversions if that's any consolation. To me, this book is long overdue, and very welcome. A little bit of fine-tuning and it may become as important as our beloved benders' bible, Neon Techniques and Handling (although I hope it never gets that outdated).

To diffuse or not...

...to diffuse, or notes on ignorance and tight-lipped neon veterans:

I asked in a previous issue, "Do I need a diffusion pump or not?" Back then, I was ready to plop the cash down and be done with it, but I kept wondering, what about the gentleman with the 40-year-old system that has never been cleaned whose tubes burn in readily, run cool and, believe it or not, that I have never seen darken due to mercury staining? I was fortunate enough to work for him for a summer, seeing tubes that his father had made in the fifties, made on the same equipment that I was working on, that were brilliant still.

So what gives? Do I need a temperature indicator when he had used toilet paper for 40 years? I use toilet paper and have had very satisfactory results.

Do I need a diffusion pump when he has never had one? Larry Albright (Signs of the Times, Nov. 1991) doesn't think that diffusion pumps are all that great of an idea while Mark Snyder (ST -- take your pick!) thinks they're indispensable. Wayne Strattman (ST -- March 1991) did some very interesting tests and concluded that there is a fairly high level of "forgiveness" when processing neon tubing.

I have decided to buy the pump anyhow; I'll be out a couple of bucks but I can't see that it can hurt anything.

My point being, there is a lot of conflicting information concerning neon pumping techniques; to the student fresh out of neon school, wanting to set up shop, it's a nightmare -- I know, I did it.

If you talk to a distributor, more than likely you'll get someone who has never seen a manifold and knows nothing except what is in their catalog.

Talk to a manufacturer, and you will need the Rolls Royce of the line with all the trimmings and nothing else will do -- period. And I went through all of this, I KNOW! You can't blame the manufacturer though, they are in business to make money; it's their job to sell you the best.

Forget talking to another sign shop: you are the evil competition that is a threat, and for some reason, neon secrets are less leaked out than U.S. military secrets! My personal recommendations are as follows:

1. Ignorance is not bliss. Learn all that you can about your craft, including the technical stuff, like what happens inside a neon tube, what is a noble gas, why use iron ore for electrodes, why use mercury? My college chemistry classes have helped me immensely.

2. Don't ever take any one person's advice! You may not need that turbomolecular pump with cryogenically cooled diffusion pump. Faithfully read and study Neon Techniques and Handling and any information you can get your hands on before purchasing any equipment!

3. Subscribe to trade journals! These are a MUST! Fill out the reader's survey cards in Signs of the Times for information on manufacturer's products.

4. Start small and build up your equipment. Start with the basics and as you get money and as you feel that you need them, add a piece or two of equipment at a time. Before long that turbo pump will be yours.

5. DON'T HOARD INFORMATION! We have enough of this problem as it is.

6. Never make a hasty purchase of any equipment whatsoever... wait and learn. If I can personally be of any help to anyone (I don't profess to be any sort of divine expert, but I know how starting out in this business is), feel free to write me; I'll help in any way that I can:

She Came From Planet Neon
Joseph Keller
#12 Harperwood
Northport, Alabama 35476.

P.S. Changed my name because "Neon City" bores me to tears and "She Came From Planet Neon" sounds so much artsier. The change is not because I accidentally grabbed hold of a live 15,000/60 wire causing me to find meaning in my life by shaving my cat and sticking my spark coil tester to my tongue.

<Editors' note: Joseph Keller calls himself a "mad scientist and pilgrim in search of classic ruby red that doesn't have to have a human sacrifice so that it doesn't crack or burn out before it burns in." He sagely adds, "Job security in the neon business is a pocket full of rocks.">

Custom powders make coat of many colors

<Editors' note: Dick Boonstra of De Blaecker, a Rotterdam neon supply firm, teaches neon production (a four-year night course) at the technical school in Delft. A true bastion of Dutch neon technique, Dick was not easily won over to the American way of neon, but the months of verbal and technical exchanges have led to understanding on both sides.

Now Dick has passed a peace pipe, and -- What? it's filled with white powder? But also alcohol, sticky stuff and sponges; Dick kindly shared these guidelines on powder-coating tubes. If you try this, drop us a note on your results; Ted's hankering to try it too.>

By Dick Boonstra (translated by Roy Dusza)

The following is an overview of techniques used to apply phosphorescent powders to glass for neon lamp production. There are four different methods:

1. Cold fluorescent mix: A liquid consisting of phosphors, binders and alcohol (or acetone) is put through the tube, leaving a thin layer on the inside surface. This is blown dry using warm air. The result is often stripey and the adhesion on the glass is not so good. This method is seen here in Europe as an emergency method, for temporary repairs.

2. Pre-coated tubing: Tubes are pumped full of a solution of phosphors with nitro cellulose, pure (medicinal) 96% alcohol and a binder combined with a plasticizer, then blown dry with warm air.

3. Dust coating after bending: This method is quite popular in Europe. A sponge dipped in binder is blown through the tube, leaving a thin film of binder in the tube. Some dry powder is put into each end of the tube which is then shaken and turned until the whole inner surface is coated with a layer of about four microns of phosphor. A disadvantage of this method is that the light output gradually reduces due to "black burning," which is caused by a reaction between the powder and the specific binder necessary for this method. Dark patches can also form as a result of mercury molecules becoming trapped between the relatively large grains of powder and the glass wall.

A second method of applying binder to the inner wall is to fill 30% of the tube with glass beads that have been coated with binder, the glass beads having a diameter of 1.5 to 2.5 mm. The tube is then shaken and turned to ensure an even coating of binder inside the glass. The powdering method is then the same as above.

4. Suspension coating after bending: Commonly known as the Philips method, as this system was developed by Philips Eindhoven (Netherlands) in 1952. The phosphors are dissolved in a mixture containing small quantities of binder and large quantities of fast-drying fluids such as spiritus fortior and amelis acetas. The suspension mixture is poured into the tube, which is then shaken, and then it is poured out. The tube is then held in an electrode-down position until a somewhat thicker layer forms on the back side of the tube (which will not be visible in the finished sign). A uniform, thin layer of about two microns is left in the rest of the tube, and it is blown dry with hot air while still resting in the same position. The tube must then be baked in an oven with a temperature of 410° to 450° C, so that the binder and other impurities are completely removed. The glass is also annealed by this temperature, removing any strain in the glass after bending.

Compositon of powders

The colors seen are largely determined by the type of rare earth used. The rare earth is made flourescent by the addition of a small quantity of an activator such as europium or lead oxide.

The low-pressure gas discharge radiates at a level which is not visible to human eyes, namely 253.7 nanometers (nanometers x 10 is the wavelength in angstrom).

Assuming a ratio of 90% 254-nm radiation, and 10% 185-nm radiation, the resulting efficiency of the conversion is more than 60%. The two resonance lines of the low-pressure mercury discharge must lie within the optimum absorbtion band of the phosphors.

This invisible light is now converted into a higher, longer wavelength by the powders, making it visible. The powders function as a frequency converter, and the charater of the powders defines such things as emitted radiation in the visible part of the spectrum.

The phosphors must have certain characteristics, such as:

-- High efficiency, which means a good ratio between the amount of absorbed UV radiation and the amount of radiated visible light.

-- Visible light emission persistance. With alternating current, the UV radiation stops with each half-cycle of the line voltage, 100 times per second in Europe and 120 times per second in America. The emission of visible light must continue during these periods, so at least 80% of the top value of the emitted visible light still radiates. If these values are not maintained, the effect is very irritating.

-- Chemical resistance. The phosphors must be able to resist chemical attack by the discharge and mercury molecules.

By using different types of combinations of powder it is theoretically possible to make any desired color.

Nevertheless, the powder coating is one of the most essential factors in the production of neon tubes. The powder layer must be inspected before pumping. If the powder layer is too thin, the radiation conversion characteristic is not fully utilized and therefore too blue. On the other hand if the powder coating is too thick the light output is reduced because the powder layer absorbs its own radiated light.

Also of importance is the grain size. By the milling of powders to a suspension in the milling pot (1.5 liter size) the milling times should be strictly adhered to. A statistic should also be kept of earlier milling procedures to ensure a uniform quality. If milling times are too long then the grain size will become too small resulting in less light output.

Specific steps for the Philips suspension system:

[To be done after bending, before attaching electrodes]

1. Wash the tube with a solution of acid and water. This solution is made up of ten parts water and one part of hydrofluoric acid. Pour the solution into the tube and leave it there for approximately one minute. If the solution is left in the tube for a long periods of time the glass will become matte, as the hydrofluoric acid is etching the glass.

Flush the tube with running water to wash out the acid. Let the excess water drain out of the tube and then pour some acetone into the tube to extract the remaining water. Pour the acetone in a container as it can be used many times for this purpose. After that, dry the tube by blowing hot air through the tube.

For cleaning used tubes, for example repairs or repumps, a sponge or a ball of cotton batting is placed into the tube during the water flushing, ensuring that any remaining powder is dislodged.

2. Make sure that the tube is clean and dry and the same temperature as the suspension.

(see Phosphor, page 12)

Pink pool in paradise

"Nature has endowed Southern California with a beauty that instills into those who live under its charm a desire for symphony in their various appointments. The glory of the California sunshine is complete, but until recently there was no man-made method of illumination to supplement the California moonlight in keeping alive those beauties by night.

"The photograph of the garden swimming pool only partly tells the possibilities of artistic effects within the range of Claude Neon lighting... Claude Neon tubes fill every requirement of subaqueous use and will illuminate every part of the pool as the tubes may be mounted in any position, curved to fit along walls, or at any point in the sides of the wall or along the bottom.

"There is no metal to rust or corrode, and since no heat is generated, there is no condensation. The presence of ultra violet rays in the light produces a phosphorescent effect which greatly enhances the beauty of the illuminated pool..."

-- 1930 Claude Neon News

On movie marquees

"Honor them all. Remember how once their splendor blazed
In sparkling necklaces across America's blasted
Distances and deserts: think how at night the fastest
Train might stop for water somewhere, waiting, faced
Westward, in deepening dusk, till ruby illuminations
Of something different from Everything Here, Now, shine
Out from the local Bijou, truest gem, the most bright
Because the most believed in, staving off the night
Perhaps, for a little while longer with its flickering light.
These fade. All fade. Let us honor them with our own fading light."

-- John Hollander

(Bull, from page 14)

or pyrex manifolds? Some questions I would ask: Any problems with flashback? (i.e., burning out O-rings in closed pyrex valves, or persistent incurable flashback on metal manifolds)? What about the mercury amalgamating (and attracting impurities) in brass or copper manifolds?

"One last request: Does anybody have a copy or can make a copy of the Thordarson Neon Sales Manual (advertised in Signs of the Times June 1939)? Also any cold cathode sales/design manuals would be appreciated."

Some tips from Eric Rothwarf at Sky Neon in Philadelphia: "I was installing a large sign in a window, five by seven feet with 11-inch letters, powered by two 15,000/30 transformers. It was making an awful racket. I know that I had those transformers loaded to the max. They were humming, but the sign itself was chattering too.

"Using my knowledge that noise is vibration, I got out a tube of silicone glue and went around squirting ample dollops of this foul-smelling product of chemical engineering on the various connections and wires holding things together.

"It worked like the hand of god. I got rid of all the noise in the sign itself. I will never do an installation again without a tube of silicone glue by my side."

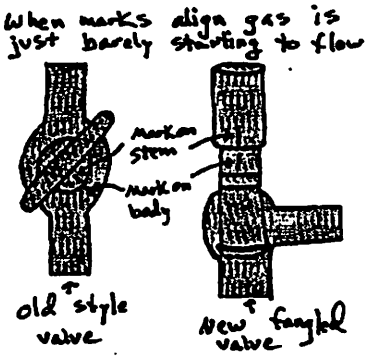
Eric adds a cautionary note: "A student of (X) accidently blew up his shop and it burned to the ground. A lifetime collection of woodworking and neon tools was destroyed in that fire, as well as a place that gave me some of my fondest memories (by the way, the student was able to get out, not too badly hurt). The explosion and fire started when the student was lighting the propane fires, trying to get X's station lit but was unsuccessful. She went to light her station and then returned to light X's. By that time enough propane had collected (X had about five torches at his station) that there was an explosion that blew out the cinderblock wall five feet away.

"Another tip: I use a glass manifold, and when the bottles get low, ladleing the gas into the unit becomes tedious. To speed things up, I open the top stopcock full open, and just turn the bottom one very quickly. In one or two turns my units are full of gas.

"P.S.: Have you seen "Car Glow" neon on cars -- it is fabulous. Any info on this would be appreciated."

<Ted here, adding a personal observation: I have been using a single stopcock for my gas flasks for a long time, as a way of reducing potential leaks, breaks, or time spent cleaning them.

<The trick to doing this is to have a pair of marks, made with a felt-tip pen, that show when the gas just begins to flow through the valve. With quarter-turn grease-type stopcocks a light touch is needed; I use two hands, one to hold firm the stopcock body and one to turn. With teflon-stem O-ring-type stopcocks it would be hard to shoot past and overfill; the amount of control is great, even with a new flask.>



Edward DeZuzio sent advice for shooting neon photos (sent with photos of an unusual script job and some arty window graphics): "400 ASA/ISO film speed; rainy, cloudy days are better than night, since colors are clearer and don't drown each other out. 4.5 aperture (or 3.5 to 5.6); 1/60th to 1/125 shutter speed; flash helpful for longer distances."

Edward reported also that "the open house [at New York's Experimental Glass Workshop] was great. I met a couple of young inspiring benders, one of whom wanted to know why you put a cork in the end of a tube. They just started class!

"Also signed up for 'Glassblowing: A beginners' weekend.' The workshop offers many classes pertaining to glass. For instance, did you know that they can use glass to eat off of or drink from? You know, there are people out there who love to see light refract through and around a piece of glass rather than emanate from a piece of glass.

"Amazing; you learn something new every day."

Suppliers roundup: Files and other fun stuff

Eric Rothwarf of Sky Neon in Philadelphia writes, "I want to let you know of a great source of tools that I just unearthed. This is:

Ed Mar Crystal and Jewelry Co.
710 Sansom St.
Philadelphia, PA 19106-3296
Tel (215) 922-5469; (800) 346-7614

"They will be only too happy to ship you out one of their catalogs. In here you will find some of the finest files in the world. The Swiss-made Grobet brand have the reputation of being made from the hardest steel in the world.

"I purchased a warding (style) 0 cut (roughness) file with which I am particularly happy. It cuts a lot longer before needing to be sharpened.

"**Some information about files:** The lower the cut number, the coarser the grain. 00 is the lowest cut number. I bought an eight-inch file with 00 cut. This turns out to be a little larger than I am comfortable with. I think the six-inch 00 would be the best size and graininess. The other one I bought (0 cut six-inch) is a nice file too, I just think the 00 might keep sharp longer.

"By the way, Ed Mar has other useful things in their catalog; for instance, they carry the hoke jeweler's torch so popular among benders. Their price: $40.00 (elsewhere $75.00)."

Tired of the old flare-up, die-down cycling of the torches? Try a **gas pressure regulator.** This is the German brand that we use at the Neon Workshop, and they make them for a large variety of gases, pipe sizes and applications. They have distributors all over the world:

Krom/Schroder pressure regulators
G. Kromschroder AG
D-4500 Osnabruck Germany
Tel: 05 41/12 14-2 53 + 3 66
(US Distributor:)
IFS, Streetsburo, Ohio
Tel: (216) 562-5175

Gas for the in-between-size glass shop: Is your shop too small to justify a metal cylinder gas transfer system, but wanting something quicker than welding on glass bottles? Check out the **Edwards #C105-20-050 connector.**

This is a small connector with a NW10 KF fitting on one side and an O-ring slip-in 15mm glass fitting on the other side. To change bottles with one of these there's no flamework; just unclamp, put the "tip breaker" steel in the new one, and clamp it on.

These are useful if you have a manifold with KF fittings. The only other way I know of to connect glass flasks to KF systems is with Cajon-type fittings, and none of these is the right size; the only ones that'll handle 15mm glass have a much too large KF fitting, or, if the KF is small enough, the glass diameter must be around 10mm. Now, it's true you can weld on a piece of 10mm glass to the flask and make it work this way, but there you are, taking time to weld again. Or you can buy NW-KF reducers to drop the size down, but there you are spending a bunch of money and creating more potential leaks.

Handy also is the fact that the O-ring used in the slip-in glass-connector part of these is a standard NW16 KF, meaning that replacement is easy should you ever lose or destroy one.

Larry Wyatt of Fallon Luminous Products (Spartansburg SC) visited Amsterdam, and in the course of conversation said that they didn't like the commercially available blockout paints due to cracking and flaking after a few years' use.

He said that they use **Duron** brand black acrylic paint, around $14 per gallon, and that after five years of their using it, it has held up well. He said that in the event of having to repump an already painted unit that the paint "Crawls a little but doesn't burn off. You can still use it the way it is without repainting it, and there's none of the fumes of the other paint."

(Fallon produces around 35,000 "OPEN" signs per year, plus a large line of standard designs for the cash-and-carry crowd.)

Biting the dust: George Goodenow, formerly president of both Neoncolor and Xeonix, currently promoting Fallon in Europe, reports that two innovative neon products are no longer available: the **Xeonix "Blossomlite" auto-fading dimmers** and the **"Neoncolor" dipping paint** that simulated classic glass, both allegedly due to a lack of sales volume. Too bad, as the possibilities opened up by these are now gone.

After a brief mention in NN#8, **Transco** wrote to inform us that "As to the comparison of our manifold system and diffusion pump to Precision Neon Laboratories (PNL), perhaps we should clarify our position for you and your readers.

"Transco and Mark Snyder terminated a joint venture relationship over one year ago. Since then Transco has offered to the market Ultra Vac II (similar to PNL), Ultra Vac II plus, Ultra Vac III and now Ultra Vac IV....As far as pricing, our prices are very competitive..."

Normally we're not inclined to run press-release new-product info, but some sheets came from **Bertonee** (1827 54th St. S.E., Calgary ALB, T2B 1N5; 403-569-1500, 800-667-2402, fax 403-235-3339) that look interesting.

They've got several 12-volt neon power supplies (some as cheap as $13) and also a keypad-controlled transformer with a large range of animation effects. Contact them directly for spec sheets; they also have a Chicago warehouse to speed up orders for American customers.

Copies of **Glass Line** and **Fusion** magazines came our way thanks to Libby Cahill of San Francisco, and both are interesting.

Although the copy of **Fusion** was twelve years old and packed with pictures of dudes at professional meetings (and "Ladies Hospitality by Poolside"), this scientific glassblowers' journal is full of technical insights. One letter concerns removal of silicone grease -- "a ten-minute soaking in warm concentrated KOH with a final cleaning in chromic acid... (or) soaking the parts in trichloroethylene." We hope Fusion can still be reached c/o the American Scientific Glassblowers Society, 1507 Hagley Road, Toledo OH 43612.

Glass Line is primarily for lampworking glass, but of course there's a degree of interest for neon folks, especially those pushing the edge of what can be done. Our issue, Oct.-Nov. '91, has some advice for photographing glass artworks, a chronicle of one happy romance with an in-shop oxygen generator, and an ad for video courses on lampworking. Contact them at P.O. Box 847, Huntington Beach, CA 92648.

The omniverous Ed DeZuzio liked the taste of **Glass** magazine, which he said is a full-blown, full-color publication from the New York Experimental Glass Workshop, published quarterly, available at $28 (in U.S.; add $20 outside U.S. and Canada).

Edward gives us the business on pricing

<Editors' note: Val asked Edward to write about the East Coast recession (we know it's everywhere, but we hear the most about the East). Being a young dude, Edward took a positive approach, and gave a chunk of his business philosophy and sales practices.>

By Edward DeZuzio

A very common answer to the question of "Why are you interested in neon?" is "People need to know that we are here." Well, I always tell the inquiring customer that NEON, custom luminous tube signage/graphics, is the strongest way to do that.

It was a damp and misty morning. Chic rode into town alone, tired and wet. He needed a good cup of Joe. After passing many places that looked deserted and gray (any other lonely words out there?), Chic noticed a strong pink and turquoise glow. A flourescent blue filled with neon and turquoise argon-filled tube glow. Breaking up the gray by clinging to the water droplets which hung, almost motionless, in the air.

He had found what he searched for: Joe's Diner surrounded by inviting lumenescence. Chic was now a styling dude -- he got his coffee to go for fifty cents. Just as the diner's window neonette told him, it let him know in a most enlightening way that his search had ended; he needed to look no further:

COFFEE
50c.
TO GO

So you may be asking how Joe bought his sign and why. Well, the why is easy, but the how is more detailed.

Joe was visited by Tubehead Signs, which was making cold calls up and down Main Street USA. The tubehead asked him why he didn't have a luminous tube sign in his window and if he would like a quote on one that let the public know what Joe's Diner he had to offer. Joe saw no harm in this -- the quote was free. The tubehead gave him a quote of $475 plus tax.

Joe saw that as 900 cups of coffee. At 250 cups a day, the sign would be paid for in less than a week, not to mention the new customers who would now know they can get coffee on their way to work.

About a week later the tubehead stopped in for a coffee to go and asked Joe if he was still interested in the idea of corporate identity via a neon sign. Joe said yes, he was expecting a visit from Sputterhead Signs to pick up a deposit and go over the specs of his proposed sign.

Joe said that he called around for quotes and Sputterhead Signs was the lowest, almost half the quote that Tubehead gave him. The tubehead appreciated Joe's interest in a sign and his search for a fair price, but advised Joe to compare the specs...

Quotes and sales

...I think it's hard to pinpoint a price via telephone. When I give quotes over the phone I explain to the customer that this dollar amount is a "not to exceed" figure. Let's face it, for one, you really have no idea what the installation will entail (without seeing it).

I recall one order I filled that went fairly smooth but not without an occasional bump. Via scaled artwork and fax communication with descriptions of the installation site and other pertinent info -- well, what was left out was that above the ceiling tile there were overhead doors! The storefront was once a garage. With imagination the work was completed neat and safe, but this extra time adds up over ten installations.

This is the main reason for a padded (with big fluffy pillows) dollar amount. A future customer, I feel, needs to understand what he is going to purchase and why it will cost X amount of Duckettes.

A phone call sometimes can't do that. It's a much better set of circumstances if you go see the customer or, if she or he wants to save money, let him or her come see you in your shop. My phone quotes are usually 25-50 percent higher than other phone quotes -- a lot of lost interest and customers.

When you see the customer in person you can show him all that stuff you pick up at conventions and shows; let the customer see what different transformers look like and when they ask how big they are...

Get it? How about those color samples sitting under your bench -- Trodem', bombem', fillem' up & gettem' organized. All the sales calls I go on with samples reveal oohs and aahs (there are some other exclamations made as well but spelling them would be a little tricky).

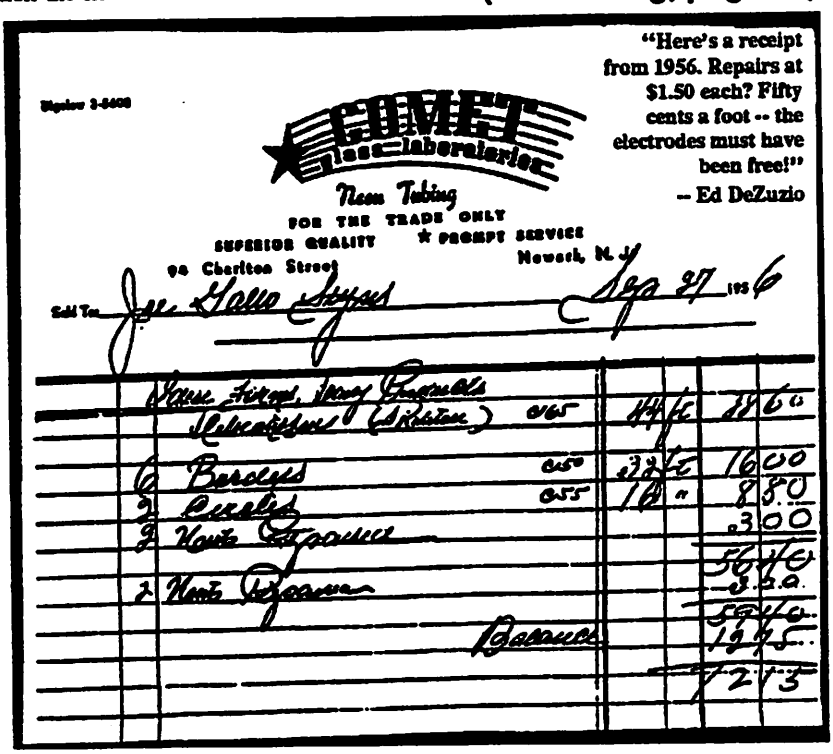
That's another thing that a phone call can't do. How do you explain the difference between clear red and ruby red? A picture, in this case, may be worth a thousand dollars.

If you lose work to a lower bidder, be sure to check out the work when it's done. (You may be glad you didn't come close to the price.) Is it done in a similar fashion to the way you would have done it -- safe, neat, clean? If so, shop for better prices on raw material, maybe make $25 an hour instead of $35 an hour...

There are price wars here in Jersey. Some work I see is "you get what you pay for," but the customer may not know that without pictures of previous work you've done or samples of colors or -- if you can afford to do it (time and/or money) -- a quick full-size sketch of what is proposed.

Another thing I give to customers is two or three previous customers' phone numbers and addresses. "References available

(See Pricing, page 12)



"Here's a receipt from 1956. Repairs at $1.50 each? Fifty cents a foot -- the electrodes must have been free!"
-- Ed DeZuzio

The lighter side of a heavy anniversary: #10

By Audie Foote

To most people this April 15 was the dreaded Tax Day, but for me it marked a decade since my graduation from neon school. Which, if enough of my brain cells are left intact for me to add correctly, makes me a TEN-YEAR JOURNEYMAN. A seasoned cagey veteran, a crafty right-hander, a veritable glass-bending, tube-sawing, blockout-painting, ladder-climbing, money-making neon machine. A tubebending Terminator of sorts who is relentless in his pursuit of a glass job and a buck. Give me a beer, bartender, this Bud's for me! Ten years! What a stud.

...What am I talking about? Ten years of cursing and bleeding and arguing with no-brain customers, while taking the more than occasional major shock? Ten years of hoping that the substances I was working with weren't slowly transforming me into a Phosphored Phrankenstein?

It's been a disaster and a delight rolled into one big burrito. And yes, I've even managed to make a living off of it; probably grossed a couple million in those ten years (those of you who don't know what "gross" means, bust out your Funk & Wagnalls). Not bad for a six-week graduate of Dean Blazek's Northern Wisconsin School of Neon and Weight Gain Clinic (I added thirty pounds eating country cooking and chugging Old Style beer).

Just by coincidence, I was visited by Dean and his wife Polly here in Hawaii, and Dean too was surprised that it had been ten years since "Audie the Animal" ravaged the serene Wisconsin countryside. It was a great opportunity to ask Dean questions I've wondered about all these years, like "How the hell do you make the letter 'O'?"

His visit got me thinking about my school days, like the day I arrived and Dean's daughter accidentally slammed the car door on BOTH of my hands as I left their car: "Welcome to the painful world of neon!" I later found out that she did this under orders, so Dean could evaluate my threshold for such things. His motto was "Don't wimp out." You can always tell who learned neon there, as they have an extra set of knuckles.

I remember the time one girl came over to show me a bizarre attempt at a doubleback (it looked like Arnold Swartzenegger's flexed bicep). But I noticed something else rather strange. There was smoke coming up from the area of her stomach. Seems she allowed the hot glass to touch her sweater at table level and it had burnt a huge (and expanding) hole in her clothes and, I suspect, her body. You can always tell who learned neon in northern Wisconsin: they have multiple belly buttons.

The five of us got really competitive to see who would be the best bender, and therefore fourteen-hour days in the shop were the norm. Dean warned against drinking coffee while we worked, as it makes you nervous and irritable, and of course loud rock and roll was a no-no since it destroyed concentration.

Since these were just guidelines we ignored them completely, and I must have personally made Juan Valdez a millionaire, since he traded in his burro for a Jaguar the day I graduated. And loud rock and roll? I guarantee that the song "Bad to the Bone" is still reverberating in the hallowed halls of Dean's workshop. (He also warned us about overeating and drinking after hours; but I already told you I left there looking like I spent six weeks eating corn through a picket fence.)

Recently, I found a picture of my "final project." Dean would let you make anything you wanted using any glass you wanted -- and he had a tremendous stock, including exotic glass that was no longer available anywhere.

So of course I drew up this grandiose plan for my company name complete with swaying palm trees and setting sun, and the rugged coastline of of Kauai. Did I mention that the lettering was a difficult script style?

I figured no one in the history of neon could do a job like this in only six weeks, and I was right, no one could.

Oh, I completed it all right, and I thought it was the greatest at the time, but looking back now it appears like a flashback from a bad acid trip, the lettering vaguely resembling a cut-and-paste ransom note. The upper-case script looks like it was written by someone with an incurable disease of the nervous system.

The highlight of the whole experience was the unveiling. One guy's project was his name in block letters: "TOM." An impact statement if ever there was one. Another restored an old beer sign.

Then I asked to have the lights turned down so I could switch on my masterpiece (which I later entitled "Tropical Barf"), and as I put my left hand on the big transformer (a twelve, I think) to brace it while I pulled the cord, I got zapped; a defective transformer casing, it seems. Well, I screamed like my hair was on fire (which may have been the case) as everyone in the room howled with laughter. I'm told it was the most memorable unveiling of a final project to this day.

Ten years! Boy, time flies when you work with mercury! I think I'll go celebrate. Anybody got any Old Style beer?

<Other news from Audie's Alohaland:>...Last week I finally was told to go ahead and install the sign I made for a soul food place. Their clever motto is "A SOULFUL EXPERIENCE IN DINING," which of course I had to do in neon. I told them I didn't believe in false advertising so if their food was no good I would come back and change the word "soulful" to "woeful." To which the owner said, "DON'T BE JIVING WITH MY SIGN, SUCKER!"

Anyway, to save money I was installing this one personally (CALL 911! CALL 911!) and I found myself on top of a pitched roof, at night, no light, with a steady drizzle coming down (ah, the thrill of working with high voltage at night in the rain) -- but I was determined to get it over with so I wouldn't have to come back to this dire military town. So it was me and some bumpkin electrician who I'll call Gomer, out there by ourselves until this job lights.

While I'm up on the roof doing the secondaries to four transformers, Gomer decides he's hungry and says he's taking a break and do I want something from Pizza Hut? No thanks, I says, I just wants to get this MUH-FUH finished (I was already talking like the cafe owner). I see him go walking off next door.

Well, my bladder is about to burst, but I don't want to climb down a wet ladder. So I look around and think, what the hell, no one's going to see me, and Gomer's at Pizza Smut. So I decide to "drain the dragon" right there on the roof, and as I was finishing I saw the ol' yellow river heading down the roof like an Idaho rapids in springtime.

However I had not quite gotten "Puff" back into his cave when I heard a loud "HEY-Y-Y-Y-Y" and saw Gomer running out from under the eaves brushing something off his head.

"What the HELL was that?" Apparently he had gone back to his car to get his wallet.

"Uh, uh, I just dumped some rainwater out of one of the transformer boxes."

"Rainwater my ass, I never felt rain that warm."

"Uh, no, honest, it was rainwater."

I guess he believed me simply because it was best for him that he did.

(Phosphor, from page 7)

3. Use gloves so as not to transfer body heat, otherwise your fingerprints will be visible in the finished tube.

4. Put a rubber stopper in one end and pour in the phosphor suspension. Manipulate the tube so that all inner surfaces are covered, then pour out what's left into the stock bottle while holding the tube in a "electrodes up" position (the "viewing" side facing down).

5. The tube should now be turned over to "electrode down" position in one flowing move, so that a layer is formed at the backside of the tube. This layer is called the "mirror" because it is opaque and reflects light to the front of the tube.

After this layer is formed then hot air is forced through the tube to dry the remaining solvents. This proceedure ensures that a sufficient powder remains at the front side of the tube. Suck hot air (60° C) through the tube for a few minutes.

6. Place the tubes in an oven and bring the temperature up to at least 410° - 450° C, depending on glass composition, (suppliers should be able to give you information on the glass annealing temperatures) within 100 minutes. Leave at this temperature about 15 minutes while a blower is sucking the excess of burned nitrocellulose and other solvents out of the oven. This will sinter the coating to the inner wall of the tube. Cool off at approximately 1° C/ minute (about seven hours).

7. Attach electrodes and pump the tube as usual. The initial evacuation should be rather slow, because if vapor pockets in the mirror remain, these will explode or shatter and the mirror at the backside of the tube will come loose, and then there will be cracks in the suspension. These loose pieces of suspension can be sucked into the manifold or the pump itself, affecting the pumping capacity or even damaging the pump.

<Editors' note: I've heard (but not confirmed) that dry powders can be purchased in the U.S. from Voltarc, EGL and FMS, and also Sylvania. Masonlite carries these as well; their U.S. distributor is Transco. De Blaecker of course carries a full line of powders, glass beads, etc., and can be reached at

Zestienhovensekade 33a
3043 KH Rotterdam
NETHERLANDS
Tel: 011-31-10-437-7402
Fax: 011-31-10-415-1121

They also have available a videotape of all of the European-style neon techniques; however this would need to be converted for American viewing as it is in European (PAL) format.

(Seeing spots, from page 5)

IMMEDIATELY and THOROUGHLY dried by blowing air through them before attaching electrodes. Oven drying is helpful, but it should not be attempted before drying with air. If the tube is still moist when it is put into the oven, small spots will appear.

Water washing will reduce the brightness of the halophosphate tubing to some extent and is therefore recommended only for those cases where it is known that too much heat has been applied.

4.0 Darkening covering the whole tube: The whole tube may look grey, brown, a depressed yellow or black. The discoloration may be uniform over the length of the tube or there may be an area of normal brightness near the middle. (See section 2.3.)

This darkening sometimes looks like the dimming that is due to lack of mercury vapor. One can determine which it is by heating a small section with a torch and watching the change in brightness. If only this section brightens, the tube is stained. If a brightness develops which extends some distance beyond the heated area, it lacks mercury.

Darkening of the entire tube may also be confused with other low light output conditions. If the tube has a uniform low brightness without any evidence of stains, it is probably just old. Tubes operated on an overloaded transformer also may look dim and

(see Stuff stains, page 13)

(Pricing, from page 10)

on request"? If you are willing to share that info anyway just give it, it's done and your foundation is set a little deeper.

Follow-up calls, visits, letters are priceless too -- lots of visits yield "We were just thinking about you" and more work or a reference. In sales, which is by far not my favorite aspect of glasswork, you can never have too many fishing poles. (Fishing poles? Damn, where do these words come from?)

Trade work and pricing

I used to think that wholesale (trade work) was bull____. What's worse than supplying your competition with a product that is as rare as the people who can make it?

I know what's worse! "While-you-wait" repairs! Nothing can break up the smooth flow of glass from one's fingertips worse than a "fix it fast" repair.

What's the theory behind 7-11 coffee and FedEx overnite? I think it's convenience. It's well proven that people pay for convenience.

A while-you-wait repair is a convenience to a sign company and an extra 45 minutes of work at the end of the day for the tubebender -- would it be fair to charge the extra hour to the customer whose glass you were working on originally? Try it and hear the (if you're lucky) laughter.

After two years of doing while-you-wait repairs at the same price as five-day turnaround repairs, I've changed my pricing. In fact, I can't believe it's taken that long to hit me.

Same theory, different circumstance -- repairing glass that another bender has manipulated. Anyone out there have units made by "X" crumble near the fire or on the bombing table? These are reasons for higher prices. They are legitimate and can be a proven place for lost profits. But it need not be that way.

Your trade customers may not dig these new theories but believe me they all understand.

Back to tradework theory, on being a supplier for your competition. Yeah, that's the easiest way to put it, but it may keep you above water and employed. If it helps, look at it like a giant sales staff that PAYS YOU instead of the opposite. If it's not enough, then do something about it.

But what? Well -- a longer turnaround time for trade work. Let's say a two-week turnaround time for retail/non trade customers and three or four weeks for trade work.

At this shop we've been blessed enough to keep everyone on a three-week TAT. Nobody really digs it but they appreciate it. You can compensate for the time difference with pricing and givums. If a trade customer orders five million feet of glass, throw in some tube supports or similar components; they will be back. Don't sacrifice sanity (your own) or quality because time won't allow it. That's nonsense!...

...<He's considering "seminars for customers who own or want to own neonage":> It lets the customer see why their request is $900 and not $600; it will allow the customer to learn what exactly it is she/he is going to purchase. Heck -- you'll get to show off a little too...

(Stuff stains, from 12)

stained when they may be merely operating at a reduced current.

If the condition actually is a darkening or staining over the whole length of the tube, it can be caused by a number of different things. These causes are listed below in order of decreasing probability:

1. Poor vacuum conditions. Either a slow pump or a large air leak in the manifold can cause this staining. Wet tubing can also do it by slowing down the pump and/or by contaminating the emission coating.

2. Inadequate electrode bombarding.

3. Glass not heated sufficiently during pumping. This can be particularly troublesome when using no-bake tubing.

4. Too short a pumping and bombarding period.

5. Contaminated mercury.

6. Contaminated tubing. Again, no-bake is difficult to process.

5.0 Irregular dark patches. Darkening of this kind takes the form of stains of irregular sizes and shapes, colors and locations. This group includes those stains which do not ordinarily cover the entire circumference of the particular area in which they are located. Stains such as these are usually foreign matter.

1. Bits of rubber give small roundish stains with a defininite darker center. They are frequently yellow.

2. Small pieces of emission coating make small irregular blotches. They are generally yellow or gray, but pieces which fall onto very hot fluorescent coating may turn blue.

Oil in the tubing may produce stains of irregular shapes and colors. It can come from splicing fires, the diffusion pump, stopcock grease, oil manometers, or 'gremlins.'

3. Oil may give regular or irregular shapes and colors. It can also produce a light yellow stain going around the tube and extending a large distance. It is likely to turn black. (The oil may come from splicing fires, the diffusion pump, stopcock grease, oil manometers or "gremlins.")

4. Mercury collects around cold spots in a tube, such as near tube supports, and makes small but unsightly dark areas. Its effect on the fluorescent coating may be the same as described in #8 below.

5. Moisture in a tube can produce strange-looking bands and streaks. These are usually quite narrow and are essentially the same as described in section 2.4. If narrow, they apparently do no great harm.

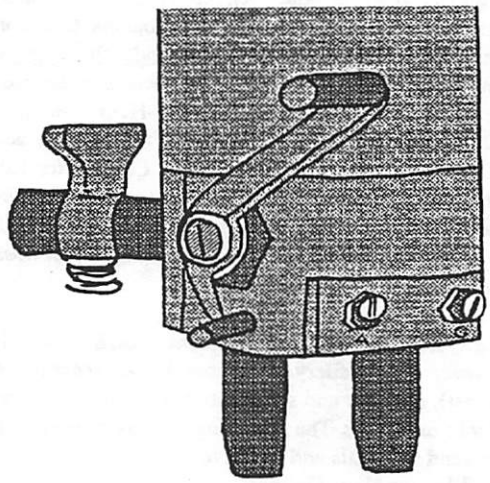
6. Mercury, contaminated by contact with an overbombed or hot electrode, may produce a number of very thin black streaks up to several inches long which are generally harmless. Sometimes the streaks may be as wide as a quarter-inch; they can be a serious appearance defect.

7. Stains shaped like half moons and located close to the electrode are caused by overbombing. They seldom become serious.

8. Heavy clusters of mercury droplets, sometimes in the shape of a large teardrop, also appear in connection with overbombing. The teardrops are usually a minor defect unless the concentration of mercury is heavy. In such cases they may lift the flourescent coating off the glass, leaving bare spots.

This completes the list of important stains. Other types are occasionally seen. These, like the types discussed above, can be prevented. In fact, the cure for darkening is almost entirely a matter of bending, splicing and pumping technique.

No more Hyde & seek: How to adjust ribbon burner 'economizer'



There is nothing quite so satisfying as feeling stupid and then finding out you're not alone.

Several years ago I bought a new Voltarc-Hyde 16-inch ribbon burner with "economizer" and wondered what the hell the little screws on the economizer were, and how it was supposed to work. The older Hyde burners I'd been using didn't have these.

I called Voltarc and the man I talked to said, "Funny you should ask. When we bought out Hyde, these things came without instructions, and I can't really help you." He did confirm that the incoming pipes marked "G" and "A" are for gas and air, and that the third inlet, with the valve, is for oxygen, "...something I wish they'd never put on there -- it makes it too dangerous."

Upon dissecting the economizer, I concluded the following:

1) With the lever flipped down, you're in "normal" mode. The main air and gas inlets are open. Gas and air adjustment is made by you, externally, with in-line valves prior to the ribbon burner body.

2) With the lever flipped up, you're in "economizer" mode, which means that you've got a pilot-light-type setup. The main air and gas inlets are closed, but two tiny passages are drilled out and these are adjustable.

3) The two screws "G" and "A" adjust the pilot mixture. They only have an effect when the lever is up. To adjust them properly, turn them in as far as possible while still keeping a flame. If the flame goes out when the lever is flipped down, it's too low.

For the solenoid-valve on-off-flame crowd this is of no use, unless of course you want to cut out the hiss of the air when the ribbon is not in use. In this case just fully tighten the air valve, and flip the lever up.

Now you too can have visitors say, "Oh, so that's how those work."

BULLETIN BOARD

Wanted: good blowhose swivels. We recently purchased a dozen (from two sources) for the Neon Workshop in Amsterdam, and none of them work very well. Some only swivel on one side: sorry, but without a double-swivel the blowhose catches and does funny things. And the others are double-swivelled but don't work very well, occasionally ceasing to spin (usually just about the time the glass gets soft). Anyone have a brand or supplier to recommend?

Randall L. Caba (Portland OR), referring to last issue's story on learning neon, writes, "I am proud to point out that the Neon Art and Tube Bending School is the only independently accredited neon school in North America. The school was recently purchased by Ron and Norma Hare who own and operate Med-Help Training School in Concord CA. As such, we are working through the accrediting process again. ACCET (The Accrediting Council for Continuing Education and Training) is our accrediting agency." *<The editors can't resist pointing out that the ownership constellation is fortuitous: what burned and battered beginning bender doesn't need a bit of Med-Help sometimes?>*

From **Jay Blazek** in Seattle: "Western Neon has recently moved to a new space with a gallery/showroom. We are accepting slides (5-20 per artist), resumes and a brief statement about your work (1-3 pages) for future shows. The reviewing process is going on for 1992-3. Please send materials and SASE to:

Western Neon Gallery
2700 First Avenue South
Seattle, WA 98134
(206) 682-7738

Don't-you-just-love-the-press dep't: From a 1991 Tampa Tribune article about tubebender Candice King: "It's not unusual to find a bender with his shoes literally melted to the floor."

Also a note from her about an accompanying photograph: "If you think what I did to the mannequin is sick, you should see what I did to a stuffed barracuda."

Kinda hate to spoil a spicy quote like that with something as down-to-earth as the point she was getting around to making:

"It seems that the things that I make as a spoof are the ones that sell the fastest. The ones that I think are pretty hang out on the walls for a while."

Bob Lind writes from Tri-State Signs in Windham NH: "RE: Tom Tokarski's request: New siding and any metal components of the neon must be grounded. Also, make sure the main ground at service entrance is properly bonded. I hope this helps as it solved the same condition on a radio in a diner after new siding was installed."

Jeremy Storm is holding down our fort in Volcano, and has hooked up a "big honker" 4-inch-diameter water-cooled three-stage metal diffusion pump (purchased used and dirty for $125). With every letter he has more to report:

"I love that pump! The water consumption is small, only about five gallons per hour. Also it makes a funny crackling sound when running. I haven't noticed any back vapor. If it shows up I may try a molecular sieve. I keep it on lowest heat when running, about 65 volts.

"I think the pumping system is just leaky enough to prevent backstreaming. Ha ha. Pulls 1 micron in about a minute from atmosphere. I can really appreciate the fast pumping at low microns. It will yank 100m down to 5m in a few seconds, really nice." He also sent a piece of tracing paper with the note "Try this for patterns! No scorch (under the screen)."

Jeremy added this warning: "When experimenting with pumped gas flasks, for plasma experiments or whatever, please be aware of the dangers posed by 1.2 liters of vacuum. I tossed a pumped flask at a car in the dump and it went BANG. I was eight feet from it and felt glass hit my arm. Most of the flask shattered to dust, but some pieces were thrown more than ten feet."

From **Mark Cherveny**, Edmonton ALB: "Please throw in my word on glass diffusion pumps: Since using them, staining and snaking have become rare and classic-colored glass much easier to pump. Hot tip on classic glass -- continue first part of bombing until the newspaper is burnt black, glass should look almost black for ruby, yellow turns brownish, green turns dark green/brown. A common reason that tubes take a long time to burn in, particularly classic glass, is due to not getting the glass hot enough!

"By the way, have you ever done a survey of users of metal and/

(see Bull, page 8)

ADS

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